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ABSTRACT

This newsletter describes an ongoing empirical field study involving a description and analysis of practical teaching situations aimed at describing the content and structure of pupils' frames of reference. The project takes the form of a series of case studies in classes of the 3-year lines of upper secondary schools in Sweden. The study seeks to determine if these alternative frames of reference occur not only in science but in the humanities and social sciences as well. Another question concerns the understanding of the stability of alternative frames of reference. (CW)

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SCHOOL RESEARCH NEWSLETTER

APRIL 1988

FIELD - TOPIC
Pupils frames of reference - cognitive psychology of learning - didactics - upper secondary school

1988:2

Current project

TITLE OF PROJECT: PUPILS' FRAMES OF REFERENCE AND THE CONTENT OF TEACHING

An empirical field study involving a description and analysis of practical teaching situations in upper secondary school, mostly with reference to the teaching of history and biology, is in progress, aimed at describing the content and structure of pupils' frames of reference in the respects which are relevant to the teaching content under consideration, identifying and describing the problems which pupils try to deal with, describing pupils' ways of processing these problems, and discussing the impications of these descriptions for the choice of teaching content and teaching strategy.

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PROJECT NO.:
3134

U.S. DEPARTMENT OF EDUCATION
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SWEDISH NATIONAL BOARD OF EDUCATION

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1988:1 META STUDIES

During the past ten or fifteen years, educational research has tended more and more to focus on the dependence of learning on content and context. In other words, the outcome of learning varies depending on what the student tries to learn and the situation in which the attempt is made.

One research strategy which has gathered strength focuses on the pupils' everyday images of phenomena included in teaching and the impact of those images on the learning process. It has been shown, mainly in science teaching, how pupil images of this kind can conflict with and constitute alternatives to the scientific descriptions and explanations presented in class. It has also been shown that these images are fairly immune to teaching; in certain contexts they have been termed "instruction-proof".

Pupils common sense or everyday conceptions have been dubbed "alternative frames of reference", "child science" and "mini-theories", to quote but a few examples. These epithets are among other things intended to underscore the character of such conceptions as alternative explanatory models to those accepted in science; they are firmly established ways for the individual to understand the world around him, and not just passing misapprehensions.

As mentioned above, alternative frames of reference have been described mainly in the context of science teaching. It is an open question whether alternative frames of reference can also reasonably be assumed to occur in the humanities and social sciences and, if so, whether they have the same impact on learning there as in the case of science subjects. Another question concerns the way in which the stability of pupils' alternative frames of reference is to be understood and how we are to understand the difficulty pupils have in assimilating the descriptions and explanations presented in the course of teaching. These are questions on which the project is intended to shed light.

Strategy, scope and purpose

The project takes the form of a series of case studies in classes of the three-year lines of upper secondary school. These case studies involve following a continuous teaching episode relating to a limited curricular item. The teaching episodes studied have concerned genetics and evolution

in biology and the French Revolution, the land distribution reform in Sweden and the development of late 19th century Sweden in history teaching.

As regards method, a case study involves making observations of teaching. These observations are documented by means of field notes and, in all cases but one, by means of tape-recordings. In addition, pupils are interviewed and material produced by them is collected. The material is analysed in order to describe the pupils' conceptions of the relevant teaching content, to identify the problems they are trying to process and to describe the ways in which they do so. This analysis is viewed in relation to teaching content as intended by teachers and syllabus, i.e. the goals of teaching. The project involves an analysis of six case studies of this kind.

Pupils' alternative frames of reference

The results hitherto gained have mostly been presented in three articles produced as part of the project, viz "Learning History", "The Evolution of the Species, Pupil Perspectives and School Perspective" and "Alternative Frameworks and the Concept of Task".

In "Learning History", it is observed that pupils have conceptual difficulties resembling the difficulties noted in their studies of science subjects. The pupils conceptions of such phenomena as parliament, class, estate and revolution or expressions like "Sweden feels..." and "the USSR wants..." differ from those implicit in teaching and textbooks. On the other hand it is doubtful whether these conceptions are to be ascribed the same amount of importance as pupils' common-sense conceptions in physics and biology, for example. True, they pose problems to the pupils as regards understanding a historical account, but concepts and expressions like these do not occupy the same central position in history as, for example, the concept of force in physics.

A more crucial difficulty encountered by the pupils in understanding a historical account seems to be connected with their view of history as such, their ideas as to what is described and explained in history and what counts as a historical explanation. When, for example, an attempt is made in the course of teaching to show the structural conditions underly-

ing a chain of events resulting in a new social situation or a new political constellation, the pupils appear to look for intentions on the part of historical protagonists and to be uncertain as to the purpose of historical descriptions or explanations. It is fair to say that the pupils "personify" history and social phenomena.

When considering pupils' alternative frames of reference in history, therefore, the most fruitful approach seems to be to look for them at a more general level than that of individual phenomena. The results presented in "The Evolution of the Species, Pupil Perspectives and School Perspective" indicate that, here too, we have to assume an overriding level of common-sense conceptions.

Several studies have shown how everyday conceptions of heredity, its mechanisms and the principles of evolution differ from the image presented in school. The stability of these conceptions and their capacity for survival, apparently unaffected by the instruction received, have also been demonstrated. These conceptions, however, can apparently be traced back to more generalised conceptions of the way in which characteristics of the phenotype are transmitted from one generation to another and, for example, to vagueness about the differences between causal and purposive explanations of evolution.

Thus the investigation of pupils' studies of both history and biology indicate that we are faced here, not only with alternative conceptions of the phenomena dealt with in teaching but also with alternative conceptions at a generalised, meta-level. These are conceptions of the scope of a subject, of what counts as an explanation within a subject, of the differences between different types of explanation, of what is called science, theory and so on. In other words, these are conceptions of the rules and ideals governing activities in a subject field. Alternative frames of reference at a meta-level of this kind can go at least part of the way towards explaining why everyday conceptions of individual phenomena are so little affected by teaching. This point is enlarged on in the article entitled "Alternative Frameworks and the Concept of Task".

Learning is an intentional activity, with somebody trying to learn something in a particular situation. What this somebody tries to learn will partly depend on what he or she finds it possible and desirable to do within the framework of the conditions prevailing in the given situation and what possibilities he or she has of identifying a learning object.

Scientific explanations are intended to solve particular problems. In order for such an explanation to mean anything to me, the student, I must comprehend the problem which the explanation is intended to solve. There is good reason to suppose that pupils do not comprehend the problems assumed or presented in teaching situations, the reason being that those problems cannot be formulated within the scope of what we have here termed an alternative frame of reference at meta-level.

If this is true, pupils will try to solve a problem using methods intended for a different problem altogether. Accordingly, they will become involved in a completely different learning task from that which teaching is intended to bring about.

The practical teaching implication of all this is that great pains should be taken to elucidate the topics of inquiry that are being pursued in a subject. Thus far, however, the results of the project must be considered tentative. It is to be hoped that a future report from the project will show whether pupils' understanding is facilitated by greater emphasis on problem formulation in teaching.

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